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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIROYASU INOUE,
HIRONORI KAKIUCHI,
MASAKI AOSHIMA, and
KOJI MISHIMA

Appeal 2009-002871
Application 10/684,981
Technology Center 1700

Decided:[1] July 21, 2009

Before CHUNG K. PAK, CATHERINE Q. TIMM, and
BEVERLY A. FRANKLIN, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 15, 17, 21, 23, 25, 27, 29, and 31-34. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

I. STATEMENT OF THE CASE

The invention relates to an optical recording medium which includes a dielectric layer containing an oxide as a primary component and nitrogen as an additive for improved data recording using a laser beam in the blue wavelength band (Spec. 5, ll. 1-17). Claim 15 is illustrative of the subject matter on appeal:

15. An optical recording medium comprising:

two or more recording layers spaced apart from each other; and

dielectric layers each formed in a vicinity of one of the recording layers, the dielectric layer located on the side of a light incidence plane with respect to the associated recording layer containing an oxide selected from a group consisting of Ta_2O_5 and TiO_2 as a primary component and nitrogen as an additive.

The Examiner relies on the following prior art references to show unpatentability under 35 U.S.C. § 103:

Takaoka et al. ("Takaoka")	US 4,682,321	Jul. 21, 1987
Shuy et al. ("Shuy")	US 2001/0021160 A1	Sep. 13, 2001
Uno et al. ("Uno '787")	WO 02/29787 A1[2]	Apr. 11, 2002

[2] The Examiner cites to published U.S. Patent Application No. 10/332,263 (published as 2004/0013069), issued January 22, 2004 ("Uno '069"), which is the U.S. national application of Uno '787. An English translation of Uno '787 prepared for the USPTO by Schreiber Translations Inc. (PTO 08-3001 April 2008) was made of record in an Office Communication mailed April 11, 2008.

Uno et al. ("Uno '239")	US 6,449,239 B1	Sep. 10, 2002
Sakaue et al. ("Sakaue")	US 2002/0168587 A1	Nov. 14, 2002

The Examiner maintains the following rejections:

1. Claims 15 and 21[3] rejected under 35 U.S.C. § 103(a) as obvious over Uno '239;
2. Claims 15, 21, and 31-34[4] rejected under 35 U.S.C. § 103(a) as obvious over Uno '787 in view of Sakaue;
3. Claims 15, 17, 21, 23, 25, 27, 29, and 31-34 rejected under 35 U.S.C. § 103(a) as obvious over Shuy in view of Sakaue and Takaoka; and
4. Claims 15, 17, 21, 23, 25, 27, 29, and 31-34 rejected on the grounds of nonstatutory obviousness-type double patenting over any of the following:
   (a) claims 17-27, 29, and 31 of U.S. Application No. 10/748,979, filed Dec. 30, 2003, on behalf of Mishima et al, in view of Sakaue or Uno '239, combined with Takaoka;
   (b) claims 1-3, 7, 10, 13, 16, 19, 22, and 25 of U.S. Application No. 10/717,831, filed Nov. 20, 2003, on behalf of Kakiuchi et al.;

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[3] The Final Office Action and the Examiner's Answer list the rejection as rejecting claims 15, 16, and 21-22 (Final Office Action 2; Ans. 5). However, the Examiner and Appellants acknowledge that claims 16 and 22 have been cancelled (Final Office Action 1; Ans. 2; Br. 2). Appellants restate the rejection as listed above (Br. 4). Thus, this error is harmless.

[4] The Final Office Action and the Examiner's Answer list the rejection as rejecting claims 15, 16, 21 and 31-34 (Final Office Action 3; Ans. 7). However, the Examiner and Appellants acknowledge that claims 16 and 22 have been cancelled (Final Office Action 1; Ans. 2; Br. 2). Appellants restate the rejection as listed above (Br. 4). Thus, this error is harmless.

(c) claims 1-24 of U.S. Patent No. 7,018,695 B2, issued March 28, 2006, to Kakiuchi et al., in view of Sakaue or Uno '239, combined with Takaoka;

(d) claims 1-25 of U.S. Application No. 10/764,805, filed January 26, 2004, on behalf of Kakiuchi et al., in view of Sakaue or Uno '239, combined with Takaoka;

(e) claims 1-27 of U.S. Patent No. 7,276,274 B2, issued October 2, 2007, to Inoue et al., in view of Sakaue or Uno '239, combined with Takaoka; and

(f) claims 1-26 of U.S. Patent No. 7,321,481 B2, issued January 22, 2008, to Inoue et al., in view of Sakaue or Uno '239, combined with Takaoka.

Since no claims are argued separately from the others, we decide this Appeal on the basis of representative independent claim 15 for each of the rejections. *See* 37 C.F.R. § 41.37(c)(1)(vii).

II. FIRST REJECTION BASED ON UNO '239

A. ISSUE ON APPEAL

Regarding the obviousness rejection based on Uno '239, Appellants state that "*Uno* '239 fails to disclose, teach, or suggest at least the feature of a 'dielectric layer *located on the side of a light incidence plane* with respect to the associated recording layer containing an oxide selected from a group consisting of Ta_2O_5 *or* TiO_2 *as a primary component* and *nitrogen as an additive*," as recited in claim 15 (emphasis added)" (Br. 4-5). Appellants state that although "protective layers 2 and 8 may be arguably construed as dielectric layers since they include a dielectric," "there is no disclosure identifying what material is a *primary component* of protective layer 2" (Br.

5-6). According to Appellants, "*Uno '239* is completely silent as to what constitutes a primary component of a dielectric layer" (Br. 6). Thus, Appellants contend that the Examiner erred in finding that "'the TiO_2 or the Ta_2O_5 would *inherently* be a primary component' (emphasis added)" (Br. 6). Appellants also contend that "[i]nterface layers 3 and 5 *are not* disclosed as having a dielectric. Therefore, interface layers 3 and 5 *are not* dielectric layers (as contrasted with the *Uno '239* protective layers 2 and 8 which do include a dielectric)" (Br. 7).

The Examiner finds that interface layers 103, 105, 203, and 205 shown in Figure 8 of Uno '239 are located with respect to the recording layer as claimed (Ans. 14). These layers, according to the Examiner, may be formed from Ta_2O_5 or TiO_2 as well as Ti-O-N and Ta-O-N and "it can clearly be inferred that the titanium or tantalum oxides in the Ti/Ta oxynitrides are present as TiO_2 or Ta_2O_5 and that this meets the primary component limitation" (Ans. 16). The Examiner finds that the Ti-O-N and Ta-O-N described by Uno '239 are inherently dielectrics (Ans. 16).

Accordingly, the contentions of the Examiner and the Appellants raise the following issues: (1) have Appellants shown that the Examiner reversibly erred in finding that a layer made of Ti-O-N or Ta-O-N as taught by Uno '239 is inherently a "dielectric layer," as recited in claim 15, or (2) have Appellants shown that the Examiner reversibly erred in finding that the the interface layer of Ti-O-N or Ta-O-N would inherently have Ta_2O_5 or TiO_2 as a primary component and nitrogen as an additive, as recited in claim 15?

B. FACTUAL FINDINGS

The following Findings of Fact (FF) are relevant to deciding the above identified issue on appeal:

1. Appellants' Specification states that:

> [i]n this specification, the statement that the first recording film contains a certain element as a primary component means that the content of the element is maximum among the elements contained in the first recording film, while the statement that the second recording film contains a certain element as a primary component means that the content of the element is maximum among the elements contained in the second recording film.

(Spec. 7, ll. 17-23.) Appellants rely on this definition of the term "primary component" to apply equally to the claimed "dielectric layer" as it does to the "recording layer" (Br. 6).

2. Appellants' Specification does not define the term "additive" (*see* Spec. *generally*). Rather, Appellants' Specification states that, for a laser beam having a wavelength of 380 nm to 450 nm, it is desirable to have 1-12 atomic percent nitrogen in a dielectric layer of Ta_2O_5 and 1-5 atomic % nitrogen in a dielectric layer of TiO_2 (Spec. 6, ll. 9-17).

3. Appellants' Specification states that "[i]n a preferred aspect of the present invention, the dielectric layer is formed by a sputtering process so as to contain an oxide as a primary component and nitrogen as an additive" (Spec. 13, ll. 19-21).

4. Appellants' Specification states that "it is possible to form a dielectric layer containing the desired amount of nitrogen by controlling the content of nitrogen in the mixed gas" (Spec. 13, ll. 11-13).

5. Appellants' Specification states that

> the first dielectric layer 15 is formed by a sputtering process using a mixed gas of argon gas and nitrogen gas as sputtering gas and an oxide such as Ta_2O_5, TiO_2, or the like as a target. As a result, the first dielectric layer 15 contains an oxide such as Ta_2O_5 or TiO_2, as a primary component and is added with nitrogen. The nitrogen content of the first dielectric layer 15 is determined so that the first dielectric layer 15 has a high refractive index *n* and a low extinction coefficient *k* and the nitrogen content of the first dielectric layer 15 can be controlled by controlling the amount of nitrogen gas in the sputtering gas.

(Spec. 24, ll. 16-19.)

6. Figure 8 of Uno '239 illustrates multiple recording layers 104 and 204 surrounded by interface layers 103, 105, 203, and 205 (Uno '239, col. 11, ll. 28-40; Figure 8). Interface layers 103 and 203 are formed on the light incident side of respective recording layers 104 and 204 (Uno '239, Figure 8).

7. Uno '239 teaches that the same materials used to form interface layers 3 and 5 in Figure 1 are used to form interface layers 103 and 203 in Figure 8 (Uno '239, col. 11, ll. 41-45).

8. Uno '239 states that interface layers 3 and 5 may be an oxide nitride, such as Ta-O-N or Ti-O-N, or an oxide, such as Ta_2O_5 or TiO_2 (Uno '239, col. 8, ll. 21-31).

9. Uno '239 discloses a reactive sputtering process using a target containing the metal or metal oxide and a mixed gas of rare gas and nitrogen. (Uno '239, col. 14, ll. 12-21.) Thus, the sputtering process

described in Uno '239 is the same or substantially the same process described in Appellants' Specification (*compare* FF 3).

10. Uno '239 teaches that protective layers 2 and 8 are dielectric layers in that they contain a dielectric material, such as carbide, fluoride, or the like (Uno '239, col. 2, ll. 20-26). Uno '239 does not refer to interface layers 103 and 203 as dielectric layers (Uno '239, *generally*).

C. PRINCIPLES OF LAW

"On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness." *In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (emphasis omitted).

In general, a limitation is inherent if it is the "natural result flowing from" the explicit disclosure of the prior art. *Schering Corp. v. Geneva Pharms., Inc.*, 339 F.3d 1373, 1379 (Fed. Cir. 2003); *see also In re Papesch*, 315 F.2d 381, 391 (CCPA 1963) ("a compound and its properties are inseparable").

The recitation of certain physical characteristics does not render patentable a claimed invention which is clearly obvious over a reference that is otherwise silent to those characteristics. *In re Skoner,* 517 F.2d 947, 950 (CCPA 1975) ("Appellants have chosen to describe their invention in terms of certain physical characteristics of the roughened substrate surface… Merely choosing to describe their invention in this manner does not render patentable their method…").

When patentability rests upon a property of the claimed material not disclosed within the art, the PTO has no reasonable method of determining whether there is, in fact, a patentable difference between the prior art

materials and the claimed material. Therefore, where the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily possess the characteristics of his claimed product. *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977).

D. ANALYSIS

Appellants' arguments on the lack of express disclosure in the reference and arguments based upon what Uno '239 discloses with regard to protective layers 2 and 8 have not convinced us that the Examiner's finding of inherency is unreasonable.

The Examiner finds that Uno '239 suggests forming interface layers 103 and 203 of Figure 8 from Ta-O-N or Ti-O-N using a sputtering method similar to that used by Appellants (Ans. 5-6; FF 3-9). Based upon the similarities in composition and processing to Appellants' dielectric layer, it is reasonable to conclude that the Ta-O-N or Ti-O-N interface layers 103 and 203 of Uno '239 are dielectric in nature. *Best*, 562 F.2d at 1255; *Papesch*, 315 F.2d at 391.

Contrary to Appellants' contentions, it is not necessary for Uno '239 to explicitly recite that interface layers 103 and 203 are dielectric. *See Skoner,* 517 F.2d at 950.

Moreover, the presence of other dielectric layers (protective layers 2 and 8 (FF 10)) does not preclude interface layers 3 and 5 from also having dielectric properties. In light of the Examiner's reasonable belief that the Ta-O-N or Ti-O-N interface layers 103 and 203 taught by Uno '239 are inherently dielectric layers and because Appellants are in the best position to

demonstrate that the material taught by Uno '239 is not a dielectric material, the burden shifts to Appellants to provide evidence to controvert the Examiner's reasonable finding. *Best*, 562 F.2d at 1255. Appellants provide no such evidence.

Thus, Appellants have not shown that the Examiner reversibly erred in finding that a layer made of Ti-O-N and Ta-O-N as taught by Uno '239 is inherently a "dielectric layer," as recited in claim 15.

Nor have Appellants shown the Examiner erred in finding that, within the Ta-O-N or Ti-O-N interface layer, Ta_2O_5 or TiO_2 would be present as a primary component and nitrogen as an additive as claimed. While we agree with Appellants that the Specification provides a basis for interpreting "primary component" as meaning the component (Ta_2O_5 or TiO_2) must be present in larger amounts than the other components in the layer with the "additive" (nitrogen) in a lesser amount (FF 1-2), Appellants present no convincing argument that the Examiner's finding that the interface layers of Uno '239 would have the required "primary" and "additive" amounts of the required components is in error. Appellants argue that the portions of Uno '239 pertaining to the protective layers 2 and 8 do not support the Examiner's finding. But this argument, as it is directed to layers other than the interface layers, does little to establish that the interface layers 3 and 5 of Uno '239 do not have the necessary components in the necessary amounts.

Thus, Appellants have not shown that the Examiner reversibly erred in finding that the interface layer of Ti-O-N and Ta-O-N would inherently have Ta_2O_5 or TiO_2 as a primary component and nitrogen as an additive, as recited in claim 15.

III. SECOND REJECTION BASED ON UNO '787 AND SAKAUE

A. ISSUE ON APPEAL

Regarding the obviousness rejection based on Uno '787 and Sakaue, Appellants present similar arguments with respect to Uno '787 that were made with respect to Uno '239 in the first rejection. For example, Appellants argue Uno '787 fails to disclose that interface layer 4 is a dielectric (Br. 9). Appellants also argue that, while Sakaue teaches a second dielectric layer containing Ta_2O_5, the second dielectric layer is not located on the light incident side of the recording layer (Br. 10-11). According to Appellants, neither the first nor second dielectric layer of Sakaue is disclosed as having Ta_2O_5 and TiO_2 as a primary component and nitrogen as an additive (Br. 11).

In this rejection, the Examiner states that

> it would have been obvious to use other oxynitrides disclosed such as Ti-O-N, Ta-O-N, in place of the GeCrON interface layer in a medium corresponding to Figure 3 of Uno et al. WO 02/2978 [sic WO 02/29787] based upon the direction within Uno et al. WO 02/2978 [sic WO 02/29787] and with a reasonable expectation of improving the performance characteristics based upon the disclosure of Sakaue et al. '587.

(Ans. 8). The Examiner further states:

> [i]t is clear from Figure 1, that the use of interface layers on both sides of the recording layer is contemplated by Uno et al. WO 02/2978 [sic WO 02/29787] and from Figure 3, the use of plural recording layers is clearly taught. As the use of interface layer on both sides of the recording layer is taught, at least one of these must be on the light incident side.

(Ans. 18.) The Examiner also states:

> Sakaue et al. '587 are relied upon to teach how to form the Ta-O-N or Ti-O-N by using sputtering. The use of a Ta_2O_5 as the sputtering target allows the 10% nitrogen atmosphere to nitride the surface of the sputtered particles. The appellant evidences that the use of 5 SCCM nitrogen in 50 sccm argon (~9% Nitrogen) is described as resulting in 3.3% nitrogen in the final coating [0179]

(Ans. 18.)

Accordingly, the contentions of the Examiner and the Appellants raise the following issues: (1) have Appellants shown that the Examiner reversibly erred in finding that a layer made of Ti-O-N and Ta-O-N as taught by Uno '787 is inherently a "dielectric layer," as recited in claim 15, or (2) have Appellants shown that the Examiner reversibly erred in finding that the combination of Uno '787 and Sakaue, when used to form a layer of Ti-O-N and Ta-O-N, suggests forming an interface layer having Ta_2O_5 or TiO_2 as a primary component and nitrogen as an additive, as recited in claim 15?

B. FACTUAL FINDINGS

The following additional Findings of Fact are relevant to deciding the above identified issue on appeal:

11. Appellants' Specification teaches an example (Sample #1-2) which uses about 9% nitrogen in the gas stream (5 sccm N_2 and 50 sccm Ar) (Spec. 38, ll. 15, Table 1).

12. Figure 1 of Uno '787 illustrates a recording layer 5 surrounded by interface layers 4 and 6 (Uno '787, Figure 1). Interface layer 4 is an interface layer formed on the light incident side of recording layers 5. (Uno '787, Figure 1; English Translation of Uno '787 at 24; Uno '069, ¶ 42).

The English Translation of Uno '787 states:

> [f]urthermore, the invention is not limited to the constitution shown in figure 1. It is preferred that the constitution consists of the interface layer 4, the interface layer 6 or both of these or the constitution made from 2 reflective layers in the reflection layer 8. It is preferred that the laser beam incident side of the reflection layer 8 is provided with another layer in the reflection side or as shown in figure 3, it is preferred that constitution 200 consists of more than 2 layers of information recording layer between the 1st substrate and the 2nd substrate. In this case, it is particularly preferred since a large capacity can be achieved in the medium. In figure 3, 101 and 201 are the respective 1st and 2nd substrates. 103 and 203 are the recording layers.

(English Translation of Uno '787 at 43; s*ee also* Uno '069, ¶ 83.) In other words, an alternative embodiment of Figure 1 includes two recording layers instead of one.

13. Uno '787 states that interface layers 4 and 6 may be an oxide nitride, such as Ta-O-N or Ti-O-N, or an oxide, such as Ta_2O_5 or TiO_2 (English Translation of Uno '787 at 29; Uno '069, ¶ 49).

14. Uno '787 discloses forming the interface layers 4 and 6 using a reactive sputtering process using a metal-containing target (Uno '787 exemplifies target containing Ge and Cr for forming a Ge-Cr-N interface layer) and a mixture of inert gas and a gas having nitrogen atoms. (English Translation of Uno '787 at 46-47; *see also* Uno '069, ¶ 89.) Thus, the sputtering process described in Uno '787 is the same process or substantially similar to the process described in Appellants' Specification (*compare* FF 3).

15. Sakaue teaches that

> [t]he film forming conditions when using an oxide or nitrooxide of Ta for the second dielectric layer as in the present invention were as follows: Using a sputtering target of Ta_2O_5 and a mixed gas of Ar and O_2 (with 10% O_2 concentration) as the film forming gas, a 50 nm Ta oxide film was formed. Alternatively, using a mixed gas of Ar and N_2 (with 10% N_2 concentration) as the film forming gas, a 50 nm Ta nitrooxide film was formed.

(Sakaue ¶ 61.)

C. PRINCIPLES OF LAW

The same Principles of Law presented above with respect to the first rejection based on Uno '239 are also relevant to the issue presented above with respect to the second rejection based on Uno '787 and Sakaue.

D. ANALYSIS

As with Uno '239, Uno '787 clearly teaches an alternative in which multiple recording layers are used (FF 12). For that matter, the teachings of Uno '787 with respect to interface layer 4 are nearly identical to that of Uno '239 with respect to interface layer 3 (FF 8, 9, 13, and 14). Appellants have not convinced us that the Examiner's finding with respect to Uno '787 is deficient any more than with Uno '239 discussed above. We find that interface layer 4 is formed from Ta-O-N or Ti-O-N using the same or substantially the same sputtering method used by Appellants (FF 3-5 and 12-14). As we discussed above, based upon the similarities in composition and processing to Appellants' dielectric layer, it is reasonable to conclude that the Ta-O-N or Ti-O-N interface layer 4 of Uno '787 is dielectric in nature. *Best*, 562 F.2d 1255. Contrary to the arguments of Appellants, Uno '787

need not explicitly recite that interface layer 4 includes a dielectric. *Skoner*, 517 F.2d at 950.

In light of the Examiner's reasonable belief that the Ta-O-N or Ti-O-N interface layer 4 taught by Uno '787 is inherently a dielectric layer and because Appellants are in the best position to demonstrate that the material taught by Uno '787 is not a dielectric material, the burden shifts to Appellants to provide evidence to controvert the Examiner's reasonable finding. *Best*, 562 F.2d at 1255. Appellants provide no such evidence. Thus, Appellants have not shown that the Examiner reversibly erred in finding that a layer made of Ti-O-N and Ta-O-N as taught by Uno '787 is inherently a "dielectric layer," as recited in claim 15.

Moreover, the Examiner notes that Sakaue teaches using a similar nitrogen gas content during sputtering (FF 15) as Appellants' Specification (FF 11) so as to obtain the same nitrogen content in interface layer 4 as in Appellants' claimed dielectric layer (*see* Ans. 18). This demonstrates that it was within the capabilities of one of ordinary skill in the art to sputter to obtain "primary" concentrations of Ta_2O_5 and "additive" concentrations of nitrogen for a nitrooxide of Ta dielectric layer. One of ordinary skill in the art having presumed skill associated with sputtering processes would have been able to optimize the amounts of Ta_2O_5 or TiO_2 and nitrogen in the interface layer 4 of Uno '787 via routine experimentation in order to obtain the properties required of the interface layers of Uno '787. *See In re Aller*, 220 F.2d 454, 456 (CCPA 1955) ("where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.").

Thus, Appellants have not shown that the Examiner reversibly erred in determining that the dielectric layers, as recited in claim 15, would have been obvious to one of ordinary skill in the art based on the teachings of Uno '787 and Sakaue.

IV. THIRD REJECTION BASED ON SHUY, SAKAUE, AND TAKAOKA

A. ISSUE ON APPEAL

Appellants contend that Shuy, Takaoka, and Sakaue each separately fails to disclose, teach, or suggest a dielectric layer (located on the side of a light incidence plane with respect to the associated recording layer) consisting of an oxide selected from a group consisting of Ta_2O_5 or TiO_2 as a primary component, as recited in claim 15 (Br. 11-12). Accordingly, Appellants conclude that a prima facie case of obvious has not been established because the proposed combination of Shuy, Sakaue, and Takaoka does not disclose the claimed dielectric layer as recited in claim 15 (Br. 12). Appellants also argue that "[w]hat Sakaue '587 discloses with respect to a dielectric layer farthest from the light incidence [plane] can not be properly used to modify a dielectric layer closest to the light incidence [plane]" (Br. 12).

The Examiner states that "[i]t would have been obvious to modify the cited examples of Shuy et al. '160 by using Ta-0-N as thermal manipulation layers in place of the ZnS-SiO_2 layers with a reasonable expectation of improving the performance characteristics based upon the disclosure of Sakaue et al. '587" (Ans. 9).

Accordingly, the third issue raised by the contentions of the Examiner and the Appellants is: have Appellants shown that the Examiner reversibly

erred in determining that the dielectric layers, as recited in claim 15, would have been obvious to one of ordinary skill in the art based on the teachings of Shuy, Sakaue, and Takaoka?

B. FACTUAL FINDINGS

The following additional Findings of Fact are relevant to deciding the above identified issue on appeal:

16. Sakaue teaches that

> nitrooxides of Ta have substantially the same optical constants as ZnS-SiO_2 and their thermal conductivity is better than that of ZnS-SiO_2 (i.e. they have better heat releasing ability), the result is achieved that the disk reflectivity is the same as when using ZnS-SiO_2 for the second dielectric layer, but the signal amplitude is improved.

(Sakaue ¶ 37.)

17. Shuy teaches using a thermal-manipulating layer 20, which may be for example ZnS-SiO_2, "for either speeding or slowing thermal conduction" (Shuy, ¶¶ 26 and 45).

C. PRINCIPLES OF LAW

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary

considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 550 U.S. at 406 ("While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.").

D. ANALYSIS

The Examiner asserts that Appellants are attacking the references individually when the rejection is based on a combination of references (Ans. 21). We agree. Appellants' arguments with respect to the separate teachings of Shuy, Sakaue, and Takaoka fail to address the teachings of the references as particularly combined by the Examiner (*compare* Ans. 9 (Examiner's rejection) and Br. 11-12 (Appellants' arguments)). Thus, these arguments do not raise valid issues rebutting the Examiner's stated rejections. *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) ("Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.").

Further, we find that the Examiner's position is reasonable and based on the teachings of the references. One of ordinary skill in the art would have applied the Ta nitrooxide dielectric layer using the sputtering method taught by Sakaue in place of the ZnS-SiO_2 material taught by Shuy for the improved thermal conductivity property of the Ta nitrooxide material over ZnS-SiO_2, as taught by Sakaue (FF 16-17). *See KSR*, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.").

Sakaue explicitly teaches that the Ta oxynitride layer is a dielectric (FF 15), and we have determined above that the same material produced by the same method as taught by Uno '239 inherently includes the same components as a primary component and the same components as an additive. Additionally, one of ordinary skill in the art having presumed skill associated with sputtering processes would have been able to optimize the amounts of Ta_2O_5 or TiO_2 and nitrogen in the deposited layer via routine experimentation to obtain the properties desired in the optical information recording medium recited in claim 15. *See Aller*, 220 F.2d at 456.

Thus, Appellants have not shown that the Examiner reversibly erred in determining that the dielectric layers, as recited in claim 15, would have been obvious to one of ordinary skill in the art based on the teachings of Shuy, Sakaue, and Takaoka.

V. NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS

Appellants did not list the nonstatutory obviousness-type double patenting rejections under the Grounds of Rejection to Be Reviewed on Appeal or present any arguments rebutting these rejections (App. Br. 4). As such, Appellants have waived any argument of error, and we summarily sustain these rejections. *See* 37 C.F.R. § 41.37(c)(1)(vii); MPEP § 1205.02 (8th Ed., Rev. 7, July 2008) ("If a ground of rejection stated by the examiner is not addressed in the appellant's brief, that ground of rejection will be summarily sustained by the Board.").

VI. CONCLUSION

For the reasons presented above, we sustain the following rejections:

1. Claims 15 and 21 rejected under 35 U.S.C. § 103(a) as obvious over Uno '239;

2. Claims 15, 21, and 31-34 rejected under 35 U.S.C. § 103(a) as obvious over Uno '787 in view of Sakaue;

3. Claims 15, 17, 21, 23, 25, 27, 29, and 31-34 rejected under 35 U.S.C. § 103(a) as obvious over Shuy in view of Sakaue and Takaoka; and

4. Claims 15, 17, 21, 23, 25, 27, 29, and 31-34 rejected on the grounds of nonstatutory obviousness-type double patenting over any of the following:

(a) claims 17-27, 29, and 31 of U.S. Application No. 10/748,979, filed Dec. 30, 2003, on behalf of Mishima et al, in view of Sakaue or Uno '239, combined with Takaoka;

(b) claims 1-3, 7, 10, 13, 16, 19, 22, and 25 of U.S. Application No. 10/717,831, filed Nov. 20, 2003, on behalf of Kakiuchi et al.;

(c) claims 1-24 of U.S. Patent No. 7,018,695 B2, issued March 28, 2006, to Kakiuchi et al., in view of Sakaue or Uno '239, combined with Takaoka;

(d) claims 1-25 of U.S. Application No. 10/764,805, filed January 26, 2004, on behalf of Kakiuchi et al., in view of Sakaue or Uno '239, combined with Takaoka;

(e) claims 1-27 of U.S. Patent No. 7,276,274 B2, issued October 2, 2007, to Inoue et al., in view of Sakaue or Uno '239, combined with Takaoka; and

(f) claims 1-26 of U.S. Patent No. 7,321,481 B2, issued January 22, 2008, to Inoue et al., in view of Sakaue or Uno '239, combined with Takaoka.

VII. DECISION

We affirm the Examiner's decision.

VIII. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(v) (2008).

AFFIRMED

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